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Issued October 28, 1907.

U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF ANIMAL INDUSTRY.—CIRCULAR 117.

A. D. MELVIN, CHIEF OF BUREAU.

A CITY MILK AND CREAM CONTEST

AS A PRACTICAL METHOD OF IMPROVING THE MILK SUPPLY.

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BY

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WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1907.

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LETTER OF TRANSMITTAL.

U. S. Department of Agriculture,
Bureau of Animal Industry,
Washington, D. C., August 29, 1907.

Sir: I have the honor to transmit herewith a manuscript entitled "A City Milk and Cream Contest as a Practical Method of Improving the Milk Supply," by C. B. Lane, assistant chief of the Dairy Division, and Ivan C. Weld, assistant dairyman in that division, and recommend its publication as Circular 117 of this Bureau.

In view of the widespread interest now being taken in the production of pure, clean, and wholesome milk, the contest described in this paper, which was held at Cleveland, Ohio, is of especial significance at this time. The results have been decidedly beneficial, and it is believed that similar contests in other cities would be productive of much good.

Because of the prevalence and danger of tuberculosis among dairy cows and the importance of the tuberculin test as a means of detecting and eradicating the disease, some information regarding Cleveland's experience with this test and some suggestions for the eradication of tuberculosis have been included in the paper.

The thanks of the Department of Agriculture are extended to Dr. H. G. Sherman and Mr. Howard Strong, of the Chamber of Commerce of Cleveland, and Dr. C. W. Eddy, chief of the inspection division of the public health department, for valuable cooperation and assistance which contributed very largely to the success of the milk contest. Acknowledgment is also made to the Cleveland press for bringing the matter to the attention of the dairymen and the public in general through the columns of the papers.

Respectfully,

A. D. Melvin,
Chief of Bureau.

Hon. James Wilson,
Secretary of Agriculture.

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A CITY MILK AND CREAM CONTEST AS A PRACTICAL METHOD OF IMPROVING THE MILK SUPPLY.

THE FIRST NATIONAL MILK AND CREAM EXHIBIT.

The first milk and cream contest in this country was held in connection with the National Dairy Show in Chicago, under the direction of the Dairy Division, Bureau of Animal Industry, Department of Agriculture, February 15–24, 1906.

The object of the contest was, first, educational; second, to determine the possibilities in the handling and keeping of milk and cream produced under sanitary conditions and kept cold; third, to test a score card for rating fairly and accurately this class of dairy products. Much interest was shown in this contest from the beginning, and exhibits were sent from thirteen different States. The results were most gratifying, one of the most striking being the demonstration of the fact that clean milk, held at a low temperature, could be shipped a thousand miles across the country and kept sweet for a period of over five weeks.

It was further demonstrated that milk and cream could be scored with reasonable accurateness for flavor, chemical qualities, keeping qualities, etc., where a certain number of points were given to each.

A full report of this contest is given in Bulletin 87 of the Bureau of Animal Industry.

STATE CONTESTS.

Since the national contest was held several States have had similar exhibits in connection with the State dairy association meetings. Among them may be mentioned New Hampshire, Pennsylvania, Ohio, and Massachusetts. These contests have proved of great benefit to dairymen, particularly in pointing out defects in the product and in the styles of bottles used, and suggesting remedies for the same. One of the most common defects in milk, and one which can readily be seen, is the foreign matter in the bottom of the bottle, consisting usually of particles of manure, hair, bedding, etc. The presence of dirt indicates careless and uncleanly methods in production and handling. Another common defect is off-flavored milk, which may be due to a variety of causes, as (1) to feeding strong-

flavored foods, such as turnips, garlic, etc.; (2) to feeding certain foods to excess, as, for example, silage; (3) to odors of silage or manure in the stable; (4) to particles of manure and dirt getting into the milk, and (5) to not properly rinsing the bottles after using washing powders. Dairymen as a rule have been quick to see these defects when pointed out and to appreciate the importance from a business standpoint of producing milk as nearly perfect as possible.

THE FIRST CITY DAIRY CONTEST.

In view of the success of the national contest and those of several States, it was thought that the plan might be applicable to cities. Steps were therefore taken to give it a trial. As the city of Cleveland had already adopted the Dairy Division score card for rating dairy farms, and as this city was making a special effort to improve conditions in the dairies and the quality of its milk supply, arrangements were made with the Chamber of Commerce to conduct the contest under its auspices. This organization looked after the printing of the entry blanks, score cards, and letters to dairymen and mailing the same; furnished the hall for the meetings and laboratories for the chemical and bacteriological work; offered medals for the best milk and cream and the best dairy farms, and also furnished one judge. The Dairy Division performed the chemical and bacteriological work and supplied two judges. Some 400 producers of milk for the Cleveland market were present at an all-day conference, when addresses on timely subjects were given by representatives from the Department of Agriculture and the Cleveland Chamber of Commerce, extracts from which are given elsewhere in this article. Many questions were asked by the dairymen present, which resulted in valuable discussions.

There were three classes in the contest, as follows:

Class I. Market milk (raw).—This comprised all milk not "certified" or sold under any guaranty as to its quality. A very large percentage of the milk supplied to our cities is of this character. It was specified that it must not be pasteurized or contain preservatives.

Class II. Market cream (raw).—It was specified that this product should be sweet, unpasteurized, and free from preservatives.

Class III. Dairy farms.—All dairymen having exhibits of milk or cream in the above classes were permitted to enter the dairy-farm contest. These farms were visited by the judges and scored on the basis of a score card (see page 14).

CONDITIONS OF ENTRY.

Entry blanks were prepared for both milk and cream, but as they were quite similar only the one for milk is presented here:

[Dairy meeting and milk and cream contest, Cleveland, Ohio, March 16, 1907, under the direction of the Dairy Division, Bureau of Animal Industry, U. S. Department of Agriculture.]

OFFICIAL ENTRY BLANK.

CLASS I. MARKET MILK (RAW).

P. O. address: ———, ———. Date: ———, 1907.

C. B. LANE,

Assistant Chief, Dairy Division:

Please enter for me 6 quarts of milk to compete for prizes offered by the Cleveland Chamber of Commerce, March 16, 1907, in accordance with the conditions herein prescribed. (Signed) ——— ———.

Rules: (1) Exhibitors are allowed to make only one entry in each class. This must include in Class I 6 quarts of milk in bottles (quarts or pints), placed in a box suitable for shipping. (2) The milk to be the property of the United States Department of Agriculture. (3) Every exhibitor is required to fill out and sign the following certificate:

I, ——— ———, hereby certify that the milk entered in this competition is a fair sample of the product sold by me, that it is free from preservatives, and that it has not been pasteurized or sterilized. (Signed) ——— ———.

(Proprietor) ——— ———.

HOW TO COMPETE.

Milk to compete for prizes must be sent by express or otherwise from station nearest the producer direct to C. B. Lane, assistant chief, Dairy Division, care Cleveland Chamber of Commerce, Cleveland, Ohio. Express charges on exhibits must be paid to destination.

The package should be plainly addressed on outside; a card should also be tacked on box inside, giving plainly sender's name and address, so as to avoid mistakes in identifying packages.

In order that the milk entered by the exhibitors may be of the same age when scored, it is hereby specified that it shall be drawn from the cow March 11, and shipped by express or otherwise as soon thereafter as possible.

A representative of the Department will be on hand to take charge of the milk on its arrival and will see that it is properly cared for.

Only these official entry blanks, furnished by the Dairy Division, will be accepted.

QUESTIONS TO BE ANSWERED BY EXHIBITORS.

1. Give date and hour when this milk was drawn from the cow: ———.
2. Give place, date, and hour at which this milk was delivered to the express company or otherwise shipped: ———.
3. Does this milk fairly represent the average product of your herd in quality and cleanliness? ———.
4. How was the milk treated from the time it was drawn from the cow until shipped? ———.
5. Do you wish to compete for the dairy-farm prize? ———.

Remarks: ———.

JUDGES.

It was arranged to give the products exhibited, as well as the dairy farms in the contest, the most careful examination possible, so that the final results would be beyond question; and it may be said that the dairymen generally expressed themselves as well pleased with the

absolute fairness with which the contest was conducted. The judges were C. B. Lane, assistant chief of the Dairy Division; Ivan C. Weld, assistant dairyman, Dairy Division, and Dr. C. W. Eddy, chief of the inspection division, public health department, Cleveland.

MEDALS.

As previously stated, the Cleveland Chamber of Commerce offered medals to the dairymen. This feature increased the interest and stimulated keen competition. A gold and a silver medal were awarded for the two samples of milk scoring highest, and the same for cream. Medals were also awarded to the five dairy farms scoring the highest.

LETTER TO DAIRYMEN.

In order to bring the matter before the dairymen the following letter was sent to about 2,000 milk producers in Cleveland and vicinity:

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF ANIMAL INDUSTRY,
Washington, D. C., March 5, 1907.

DEAR SIR: The Dairy Division of the United States Department of Agriculture is arranging for a dairy meeting and milk and cream contest to be held in the Chamber of Commerce hall, Cleveland, Ohio, March 16, 1907, in cooperation with the municipal sanitation committee of the Chamber of Commerce. The object of the meeting is to discuss with the dairymen problems relating to the production and handling of market milk and cream. A special feature of this meeting will be an exhibit of milk and cream from the dairymen supplying Cleveland. These products will be carefully analyzed by experts from the Department and scored for flavor, composition, acidity, general appearance, etc. There will be three classes in this contest, as follows:

Class I. Market milk (raw), two prizes (gold and silver medals).

Class II. Market cream (raw), two prizes (gold and silver medals).

Class III. Dairy farms, five prizes (gold and silver medals).

After being scored, all the milk and cream will be placed on exhibition, accompanied by the score. Questions regarding the scoring of the various products will be cheerfully answered. Prizes will be awarded to those scoring highest in each class. The whole object of the meeting and of the exhibits is educational and entirely for the benefit of the dairymen.

All dairymen supplying milk or cream to the city of Cleveland are invited to exhibit in one or all of the above classes, in accordance with the conditions on the entry blanks inclosed herewith.

In addition to prizes offered for the milk and cream exhibited, prizes will also be given in Class III to the five dairy farms scoring the highest. Only those dairymen, however, having exhibits of milk or cream will be entitled to have their dairy farms scored and to compete for these prizes. If you desire to compete for the dairy-farm prize, do not fail to answer question 5 relating to this on the entry blank provided for milk and cream.

If the milk and cream you handle are of high quality it should be of interest and value to you to enter the contest. If your product is not of good quality you ought to know it. The defects, whatever they are, will be pointed out to you by those qualified to make a careful examination.

Come prepared to ask questions and to get all you can out of this meeting.

Respectfully, yours,

ED. H. WEBSTER,
Chief of Dairy Division.

SCORING THE MILK AND CREAM.

The scoring was done on the basis of score cards, similar to those used at the National Dairy Show already referred to. The standard for perfect milk in the present contest, however, called for a much smaller number of bacteria, and the standard for fat was also made higher. The judges experienced but little difficulty in scoring the various samples; in fact it was demonstrated that milk and cream can be graded as accurately as butter or cheese by the use of the score card, although the system is comparatively new.

All the milk and cream entered in the contest was produced March 11 and shipped to a cold-storage house in Cleveland. The scoring was done March 14, when the product was three days old.

The score cards used in this contest are presented herewith:

SCORE CARD FOR MARKET MILK.

Exhibitor: ——— ———.

Address: ———, ———.

NUMERICAL SCORE.

Flavor, 40.	Composition, 25.	Bacteria, 20.	Acidity, 5.	Appearance of package and contents, 10.	Perfect score, 100.
					Judge's score.

DESCRIPTIVE SCORE.

Flavor.	Composition.	Bacteria.	Acidity.	Package and contents.
Excellent. Good. Fair. Bad. Flat. Bitter. Weedy. Garlic. Silage. Manure. Smothered. Other taints.	Perfect. Fat, —— per cent. Solids not fat, —— per cent.	Perfect. Total, ———. Liquefiers, ——.	Perfect. —— per cent.	Perfect. Foreign matter. Metal parts. Unattractive.

Remarks: ———.

Date: ———. ——— ———, *Judge.*

DIRECTIONS FOR SCORING.

FLAVOR.

If rich, sweet, clean, and pleasant flavor and odor, score perfect (40). Deduct for objectionable flavors and odors according to conditions found.

COMPOSITION.

If 4 per cent fat or above and 8.5 per cent solids not fat or above, score perfect (25). Deduct 1 point for each one-fourth per cent fat below 4 and 1 point for each one-fourth per cent solids not fat below 8.5.

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BACTERIA.

Less than 10,000 per cubic centimeter	(perfect)	20
Over 10,000 and less than 25,000 per cubic centimeter		19
Over 25,000 and less than 50,000 per cubic centimeter		18
Over 50,000 and less than 75,000 per cubic centimeter		17
Over 75,000 and less than 100,000 per cubic centimeter		16

Deduct 1 point for each 25,000 above 100,000.

When an unusually large number of liquefying bacteria are present, further deduction should be made according to conditions found.

ACIDITY.

If 0.2 per cent or below, score perfect (5). Deduct 1 point for each 0.01 per cent above 0.2 per cent. (If Mann's test is used, discontinue adding indicator on first appearance of a pink color.)

APPEARANCE OF PACKAGE AND CONTENTS.

If package is clean, free from metal parts, and no foreign matter can be detected in the contents, score perfect (10). Make deductions according to conditions found.

SCORE CARD FOR MARKET CREAM.

Exhibitor: ——— ———

Address: ——— ———.

NUMERICAL SCORE.

Flavor, 40.	Composition, 25.	Bacteria, 20.	Acidity, 5.	Appearance of package and contents, 10.	Perfect score, 100.
					Judge's score.

DESCRIPTIVE SCORE.

Flavor.	Composition.	Bacteria.	Acidity.	Package and contents.
Excellent. Good. Fair. Bad. Flat. Bitter. Weedy. Garlic. Silage. Smothered. Manure. Other taints.	Perfect. Fat, —— per cent.	Perfect. Total, ———. Liquefiers, ——.	Perfect. —— per cent.	Perfect. Foreign matter. Metal parts. Unattractive. Lumpy. Frothy.

Remarks: ———.

Date: ———. ——— ———, *Judge.*

DIRECTIONS FOR SCORING.

FLAVOR.

If rich, sweet, clean, and pleasant flavor and odor, score perfect (40). Deduct for objectionable flavors and odors according to conditions found.

COMPOSITION.

If 20 per cent fat or above, score perfect (25). Deduct 1 point for each one-half per cent fat below 20.

BACTERIA.

Less than 10,000 per cubic centimeter (perfect) 20
Over 10,000 and less than 25,000 per cubic centimeter 19
Over 25,000 and less than 50,000 per cubic centimeter 18
Over 50,000 and less than 75,000 per cubic centimeter 17
Over 75,000 and less than 100,000 per cubic centimeter 16
Deduct 1 point for each 25,000 above 100,000.

When an unusually large number of liquefying bacteria are present, further deduction should be made according to conditions found.

ACIDITY.

If 0.2 per cent or below, score perfect (5). Deduct 1 point for each 0.01 per cent above 0.2. (If Mann's test is used, discontinue adding indicator on first appearance of a pink color.)

APPEARANCE OF PACKAGE AND CONTENTS.

If package is clean, free from metal parts, and no foreign matter can be detected in the contents, and physical condition of product is good, score perfect (10). Make deductions according to conditions.

The composition, condition, and numerical scores of the entries of market milk and cream are given in the following tables:

Table showing composition and condition of market milk and cream.

Sample No.	Fat.	Solids not fat.	Acidity.	Total bacteria per cubic centimeter.	Appearance of package.	Remarks.
1	4.1	9.82	0.235	3,100	Slight sediment	
2	4.0	8.67	.198	1,600	do	
3	3.5	8.70	.194	16,300	Clean	
4	3.4	8.55	.198	5,500	do	
5	3.7	8.61	.200	15,200	do	
6	4.5	9.02	.192	5,100	Slight sediment	
7	3.9	8.78	.180	1,600	do	
8	3.6	8.59	.174	35,800	do	
9	3.3	8.53	.187	4,730	do	
10	3.7	8.74	.174	11,300	do	
11	3.9	8.78	.183	4,900	do	
12	3.8	8.76	.189	12,500	do	
13	4.5	8.90	.180	33,000	Clean	
14	3.2	8.37	.194	38,600	do	
15	3.4	8.55	.196	5,200	Slight sediment	Bottle not full.
16	4.0	8.80	.196	6,000	do	
17	3.2	8.64	.200	3,100	do	
18	3.5	8.80	.189	17,500	do	
19	3.4	8.78	.200	17,200	Clean	
20	3.5	8.45	.180	5,400	Slight sediment	
21[a]	33.6		.162	29,200	do	
22	4.4	9.25	.216	26,500	do	
23[a]	25.0		.180	21,000	do	
24	3.9	8.90	.198	8,700	do	
25	3.7	8.86	.198	20,700	Clean	
26	3.1	8.25	.189	166,000	do	
27	4.3	8.86	.182	1,000	do	Soapy flavor.
28	3.8	9.13	.183	9,500	do	
29	4.4	8.88	.185	86,000	do	
30[a]	37.2		.162	20,700	Slight sediment	Silver medal (cream).
31	3.7	8.74	.207	18,000	Clean	
32	3.9	9.78	.200	10,400	do	
33	4.4	9.00	.200	8,500	do	
34	4.1	8.82	.192	31,300	Slight sediment	
35	3.6	8.92	.234	26,300	do	
36	3.6	8.59	.200	1,000	do	Soapy flavor.
37	4.1	8.94	.216	23,900	do	Manure flavor.
38	3.4	8.98	.200	2,100	do	
39	3.5	8.45	.198	7,500	do	Metal and rubber parts to package.

[a] Cream.

Table showing composition and condition of market milk and cream—Continued.

Sample No.	Fat.	Solids not fat.	Acidity.	Total bacteria per cubic centimeter.	Appearance of package.	Remarks.
40	4.0	8.80	0.191	6,300	Slight sediment	
41	4.0	9.00	.198	6,700	do	
42	3.3	9.03	.219	3,100	Clean	
43	4.1	9.19	.219	5,500	do	
44	3.6	8.72	.184	18,300	Slight sediment	
45	4.1	9.82	.200	5,700	Clean	Gold medal (milk).
46	3.5	9.70	.192	1,000	do	
47	4.0	9.00	.198	10,500	Slight sediment	
48	3.7	8.74	.208	5,200	do	
49[a]	18.0		.216	402,500	do	
50	3.5	9.90	.210	5,800	do	
51[a]	24.0		.182	1,100	do	Gold medal (cream).
52	3.9	8.40	.198	32,000	do	
53	4.2	8.84	.200	5,600	do	Silver medal (milk).
54[a]	31.6		.180	392,000	Clean	Soapy flavor.
55	3.9	8.90	.207	5,600	Slight sediment	
56	8.1	7.03	.207	27,000	do	
57	3.9	8.53	.200	6,700	do	
58	3.9	8.73	.200	1,500	do	
59	2.5	8.25	.185	1,200	Sediment	Metal and rubber parts to package.

[a] Cream.

Table showing numerical scores of the milk and cream.

Sample No.	Flavor (perfect 40 points).	Composition (perfect 25 points).	Bacteria (perfect 20 points).	Appearance (perfect 10 points).	Acidity (perfect 5 points).	Total score (perfect 100 points).
1	34.0	25	20	9.5	1.5	90.0
2	34.5	25	20	9.5	5.0	94.0
3	35.0	23	19	10.0	5.0	92.0
4	34.0	22	20	10.0	5.0	91.0
5	33.0	23	19	10.0	5.0	90.0
6	32.0	25	20	9.5	5.0	91.5
7	33.5	24	20	9.0	5.0	91.5
8	33.0	23	18	9.5	5.0	88.5
9	29.0	22	20	9.5	5.0	85.5
10	34.0	23	19	9.5	5.0	90.5
11	34.0	24	20	9.5	5.0	92.5
12	32.0	24	19	9.0	5.0	89.0
13	32.0	25	18	10.0	5.0	90.0
14	35.0	21	18	10.0	5.0	89.0
15	35.5	22	20	9.0	5.0	91.5
16	35.0	25	20	9.5	5.0	94.5
17	36.5	22	20	9.5	5.0	93.0
18	32.0	23	19	9.0	5.0	88.0
19	34.0	22	19	10.0	5.0	90.0
20	32.0	22	20	9.5	5.0	88.5
21[a]	37.0	25	18	9.5	5.0	94.5
22	32.5	25	18	9.5	3.5	88.5
23[a]	36.5	25	19	9.5	5.0	95.0
24	32.75	24	20	9.5	5.0	91.25
25	33.0	23	19	10.0	5.0	90.0
26	30.0	20	13	10.0	5.0	78.0
27	28.0	25	20	10.0	5.0	88.0
28	31.5	24	20	10.0	5.0	90.5
29	34.0	25	16	10.0	5.0	90.0
30[a]	37.5	25	19	9.0	5.0	[b] 95.5
31	37.0	23	19	10.0	4.5	93.5
32	34.5	24	19	10.0	5.0	92.5
33	35.0	25	20	10.0	5.0	95.0
34	36.25	25	18	9.0	5.0	93.25
35	36.0	23	18	9.5	2.0	88.5
36	31.0	23	20	9.5	5.0	88.5
37	31.0	25	19	9.5	3.5	88.0
38	34.5	22	20	9.0	5.0	90.5
39	35.0	22	20	5.0	5.0	87.0
40	33.75	25	20	9.5	5.0	93.25
41	34.0	25	20	9.5	5.0	93.5
42	35.5	22	20	10.0	3.5	91.0
43	35.0	25	20	10.0	3.5	93.5
44	28.0	23	19	9.5	5.0	84.5
45	37.0	25	20	10.0	5.0	[c] 97.0

[a] Cream. [b] Silver medal (cream). [c] Gold medal (milk).

Table showing numerical scores of the milk and cream—Continued.

Sample No.	Flavor (perfect 40 points).	Composition (perfect 25 points).	Bacteria (perfect 20 points).	Appearance (perfect 10 points).	Acidity (perfect 5 points).	Total score (perfect 100 points).
46	36.0	23	20	10.0	5.0	94.0
47	32.5	25	19	10.0	5.0	91.5
48	34.5	23	20	9.0	4.5	91.0
49[a]	35.0	21	4	9.0	4.5	73.5
50	35.0	23	20	9.5	4.5	92.0
51[a]	36.5	25	20	9.5	5.0	[b] 96.0
52	36.5	24	18	9.5	5.0	93.0
53	36.5	25	20	9.5	5.0	[c] 96.0
54[a]	32.0	25	5	10.0	5.0	77.0
55	34.0	24	20	9.5	4.5	92.0
56	32.0	25	8	9.0	4.5	78.5
57	33.0	24	20	9.5	5.0	91.5
58	34.0	24	20	9.5	5.0	92.5
59	27.0	19	20	5.5	5.0	76.5

[a] Cream. [b] Gold medal (cream). [c] Silver medal (milk).

The flavor of the samples of both milk and cream was generally good. A few were soapy, owing to bottles not being properly rinsed, and one or two suggested a flavor of the cow stable. The lowest score for "flavor of milk" was 28 points, the highest 37; the lowest score for "flavor of cream" was 30 points, the highest 37.5.

The percentage of fat in the milk was close to 4 in the majority of instances; the lowest was 2.5 and the highest 8.1. Both of these samples, however, may safely be regarded as abnormal. The percentage of fat in the cream samples varied from 18 to 37.2. The lowest percentage of "solids not fat" was 7.03, and the highest 9.9.

With but few exceptions the milk and cream exhibited did not exceed the required standard for acidity, which was two-tenths of 1 per cent. The lowest percentage of acidity was 0.162, the highest 0.235.

The number of bacteria per cubic centimeter found in the milk samples varied from 1,000, which was the lowest number, to 166,000, which was the highest. Seventeen out of the 59 samples examined contained over 20,000 bacteria per cubic centimeter, and more than half of all the samples exhibited contained less than 10,000, or a number small enough to meet the requirements for certified milk as established by the milk commissions. The lowest number of bacteria found in cream was 1,100 per cubic centimeter, the highest 402,000.

The appearance of the packages of milk and cream was generally good. Only two had rubber or metal parts. Many of the samples contained more or less foreign matter. About one-third showed no sediment whatever in the bottom of the bottles.

Of the 59 samples of milk and cream competing in this contest 6 scored 95 or over, 35 between 90 and 95, 12 between 85 and 90, and 6 less than 85. The large number scoring 90 or above is very noticeable, and indicates that the majority of the dairymen were successful in their efforts to produce high-class milk.

THE DAIRY FARM CONTEST.

This was an entirely new feature in connection with milk contests and proved to be of great interest and practical value. Twenty-five dairymen entered their farms in this contest, and the farms were visited by the judges and scored on the basis of the score card shown below. While this part of the work required considerable time and some expense, it is believed that it resulted in much good along the line of improving the conditions affecting the city milk supply. Full details of this feature of the work are given in the table.

[United States Department of Agriculture, Bureau of Animal Industry, Dairy Division.]

SANITARY INSPECTION OF DAIRIES.

Owner or lessee of farm: ——— ———.
Town: ———. State: ———.
Total No. of cows: ———. No. milking: ———. Quarts of milk produced daily: ——
Is product sold at wholesale or retail? ———.
If shipped to dealer, give name and address: ———.
Permit No.: ———. Date of inspection: ———, 1907.

	Score.		Remarks.
	Perfect.	Allowed.	
COWS.			
Condition	2		
Health	8		
Cleanliness	5		
Water supply	5		
	20		
STABLES.			
Construction	5		
Cleanliness	5		
Light	5		
Ventilation	4		
Cubic space per cow	3		
Removal of manure	2		
Stable yard	1		
	25		
MILK HOUSE.			
Construction	2		
Equipment	3		
Cleanliness	5		
Care and cleanliness of utensils	5		
Water supply (Temp. —— °F.)	5		
	20		
MILKERS AND MILKING.			
Health of attendants	5		
Cleanliness of milking	10		
	15		
HANDLING THE MILK.			
Prompt and efficient cooling	10		
Storing at a low temperature	5		
Protection during transportation	5		
Temperature of milk —— °F.			
	20		
Total score	100		

Sanitary conditions are: Excellent: ——. Good: ——. Fair: ——. Poor: ——.
Suggestions by inspector: ———.

(Signed) ——— ———, *Inspector.*

[Cir. 117]

Directions for Scoring.

	Perfect score.
COWS.	
Condition and healthfulness.—Deduct 2 points if in poor flesh, and 8 points if not tuberculin-tested	10
Cleanliness.—Clean, 5; good, 4; fair, 2; bad, 0	5
Water supply.—If clean and unpolluted, 5; fair, 3; otherwise, 0	5
STABLES.	
Construction.—For cement floor or other material equally as good (*a*)* in good condition allow 2 points; fair, 1; poor, 0; wood floor (*b*) or other material in good condition, 1; fair, ½; poor, 0; good tie (*c*), 1; good manger (*d*), 1; box stall (*e*), 1	5
Cleanliness.—If thoroughly clean, including floor (*a*), windows (*b*), and ceilings (*c*), 5; good, 4; medium, 3; fair, 2; poor, 1; bad, 0	5
Light.—Four square feet of glass per cow, 5; 1 point off for each 20 per cent less than 4 square feet	5
Ventilation.—Good ventilating system, 4; fair, 3; poor, 2; bad, 0	4
Cubic space per cow.—If 500 cubic feet or over per cow, 3; less than 500 and over 400, 2; less than 400 and over 300, 1; less than 300, 0	3
Removal of manure.—Hauled to field daily, 2; removed at least 30 feet from stable, 1; otherwise, 0	2
Stable yard.—In good condition (*a*), ½; well drained (*b*), ½; otherwise, 0	1
MILK HOUSE.	
Construction.—Tight, sound floor, and not connected with any other building (*a*), well lighted (*b*), well ventilated (*c*), 2; (*d*) if connected with another building under good conditions, 1; otherwise, 0; (*e*) if no milk house, 0	2
Equipment.—Hot water for cleaning utensils (*a*), 1; cooler (*b*), 1; proper pails (*c*) and strainers (*d*) used for no other purposes, 1	3
Cleanliness.—Interior clean, 5; good condition, 4; medium, 3; fair, 2; poor, 1; bad, 0	5
Care and cleanliness of utensils.—Clean (*a*), 3; kept in milk house or suitable outside rack (*b*), 2; otherwise, 0	5
Water supply.—If pure and clean running water, 5; pure and clean still water, 3; otherwise, 0	5
MILKING.	
Attendants.—Healthy	5
Cleanliness of milking.—Clean milking suits, milking with clean dry hands, and attention to cleanliness of udder and teats while milking, 10; no special suits, but otherwise clean (*a*), 7; deduct 4 points for unclean teats (*b*) and udder (*c*) and 3 points for unclean hands (*d*)	10
HANDLING THE MILK.	
Prompt and efficient cooling.—If prompt (*a*), 5; efficient (*b*), if 50° F. or under, 5; over 50° and not over 55°, 4; over 55° and not over 60°, 3; over 60°, 0; if neither prompt nor efficient, 0	10
Storing at low temperature.—If 50° F. or under, 5; over 50° and not over 55°, 4; over 55° and not over 60°, 3; over 60°, 0	5
Protection during transportation to market.—If thoroughly protected (iced), 5; good protection, 4; partly protected, 2; otherwise, 0	5
	100

* The letters *a*, *b*, *c*, etc., should be entered on score card to show condition of dairy, and when so entered should always indicate a deficiency.

SCORE.

If total score is 90 or above and each division 85% perfect or over, the dairy is EXCELLENT (entitled to registry).
If total score is 80 or above and each division 75% perfect or over, the dairy is GOOD.
If total score is 70 or above and each division 65% perfect or over, the dairy is FAIR.
If total score is below 70 and any division is below 65% perfect, the dairy is POOR.

Detailed scores of the twenty-five dairy farms entered in the dairy-farm contest.

Farm No.	Cows (perfect 20 points).	Stables (perfect 25 points).	Milk house (perfect 20 points).	Milking (perfect 15 points).	Handling of milk (perfect 20 points).	Total score (perfect 100 points).
1	10.0	14.0	2.0	10.0	5.0	41.0
2	11.0	14.0	7.0	10.0	0.0	42.0
3	4.0	14.0	8.0	10.0	10.0	46.0
4	8.0	3.0	12.0	10.0	15.0	48.0
5	7.0	8.0	16.0	10.0	10.0	51.0
6	10.0	11.0	7.0	10.0	15.0	53.0
7	11.0	13.0	13.0	10.0	10.0	57.0
8	18.0	10.5	10.0	10.0	10.0	58.5
9	15.0	8.0	10.0	12.0	15.0	60.0
10	12.0	13.0	11.0	10.0	15.0	61.0
11	12.0	18.0	7.0	10.0	15.0	62.0
12	10.0	21.0	8.0	10.0	15.0	64.0
13	7.0	10.0	17.5	10.0	20.0	64.5
14	12.0	12.0	11.0	10.0	20.0	65.0
15	12.0	16.0	7.0	10.0	20.0	65.0
16	12.0	22.0	12.0	10.0	10.0	66.0
17	19.5	16.0	7.0	10.0	15.0	67.5
18	12.0	23.0	11.0	13.0	10.0	69.0
19	12.0	16.0	16.0	12.0	15.0	71.0
20	7.0	19.5	18.0	10.0	20.0	74.5
21	14.0	20.5	16.0	10.0	20.0	80.5
22	12.0	18.0	17.0	15.0	20.0	82.0
23	11.5	21.0	19.0	12.0	20.0	83.5
24	12.0	23.0	15.0	15.0	20.0	85.0
25	19.5	21.0	17.0	12.0	17.0	86.5
Average	11.6	15.4	11.8	10.8	14.5	64.1
Average per cent perfect	58.0	61.6	59.0	72.0	72.5	64.1

PRINCIPAL DEFECTS FOUND.

The greatest defects on the dairy farms were found to be the lack of cleanliness of the cows and the nonapplication of the tuberculin test. This test had been applied to only five of the twenty-five herds, and as it counted 8 points in the score the low average for the cows is thus explained. The cows in fifteen of the herds were more or less dirty. The water supply was generally good. The average rating for the cows was 11.6 points out of a possible 20.

The next greatest defect was found in the construction, equipment, and cleanliness of the milk houses. Many farms had no milk houses or special rooms for handling the milk, some were lacking in the proper equipment—particularly coolers and facilities for heating water. The water supply and utensils for the milk house were generally good. Seven out of the twenty-five received a perfect score for cleanliness. The average score for all of the milk houses was 11.8 points out of a possible 20.

The third lowest rating was given to the stables, which scored 15.4 points out of a possible 25. The greatest defect here was the lack of cleanliness, although the light and ventilation were frequently

deficient. The construction as a rule received a good rating, and the cubic space per cow was generally satisfactory.

The cleanliness observed in milking was generally good, and the method of handling the milk satisfactory. These two branches of the dairy work rated 72 and 72.5 per cent, respectively.

VALUE OF THE CONTEST TO CLEVELAND.

The following letter points out very clearly some of the results which followed the contest in Cleveland:

CLEVELAND, *June 4, 1907.*

Prof. C. B. LANE,
Assistant Chief, Dairy Division, Washington, D. C.

DEAR SIR: Certain very definite beneficial results may be traced to the milk exhibit and contest held in Cleveland on March 16, 1907. It was of special value from an educational standpoint. Few of the dairymen supplying milk to Cleveland previous to the contest had any appreciation of the significance of the inspection required by the city and submitted to it largely from necessity. The various addresses and discussions demonstrated the method and the value of the inspection. The dairymen present came to understand the importance and significance of improved methods of handling milk, and many of the recommendations made have since been adopted. The dairymen also felt pleased at the attention and interest of the Government officials in Cleveland's milk producers.

With the inauguration of the inspection by the Cleveland Board of Health considerable opposition developed among the dairymen, and in some cases open enmity. With a thorough understanding of the object of the inspection this opposition has ceased and the inspection is now sought and welcomed. Cordial relations now exist between the dairymen and the inspection department. The holding of the contest and exhibit definitely contributed to this kindly feeling. Friendly rivalry has been developed among the dairymen. The visit of the inspector is looked forward to; his suggestions are usually promptly complied with, and his subsequent visits result in a higher score for the dairymen generally. The general attitude of the dairymen toward an inspection system is well illustrated by a letter recently sent by several representative dairymen to the board of health:

We milk producers, who ship milk to the city of Cleveland, desiring to make and ship milk of good quality and to observe the sanitary regulations as prescribed by your honorable body, respectfully ask that each and every person shipping milk to the city of Cleveland be required to take out a permit to be issued by your honorable body, revocable at your pleasure.

That said permits shall be classified as 1 or 2. That dairies which score 50 points or above be classified as No. 1, and all dairies which score below 50 points be classified as No. 2. That all milk dealers, shippers, and peddlers who sell milk in the city of Cleveland be required to apprise their customers by placard or otherwise at all times of the class of milk that they are offering for sale, and in case of failure so to do, or in case of said milk dealer, shipper, or peddler offering for sale milk shipped into the city of Cleveland without a permit, said milk dealer, shipper, or peddler's license shall be forfeited.

AUSTIN HERRICK.	H. E. POST.
W. A. MILLS.	G. W. ADAMS.
H. F. BICKER.	W. H. CHAMBERS.
S. H. MIZER.	A. F. DRESHER.
O. H. BENNETT.	C. E. RILEY.
E. BOWEN.	

The exhibit also had a beneficial effect upon retailers. This class has come to realize the value of sanitary milk production. Before making the season's contract they inquire into the rating of the dairies in question, discriminating against those

having a low rating, and frequently paying a premium for milk from a high-scoring dairy. There is at present an almost universal demand for a repetition of the contest annually, and the interest and participation in the contest next year would be many fold that of this contest.

(Signed.) H. G. Sherman, M. D.,
Chairman Committee on Municipal Sanitation.
C. W. Eddy, M. D.,
Chief of Inspection Division, Public Health Department.

THE VALUE OF MILK CONTESTS.

VALUE TO THE PRODUCER.

Milk contests are of value to the producer in that they point out to him very clearly the exact condition of his product. This includes, first, the flavor of the milk. Clean milk from a clean cow has but little flavor or odor. If it is fairly well supplied with fat, pure milk may be described as having a rich, sweet, clean, pleasant flavor and odor, and free from foreign taints. Too frequently, however, the ordinary market milk delivered in our cities tastes of the cow stable, or the feed, and has too much acidity from the presence of millions of bacteria. In addition to flavor, milk is tested for chemical qualities, including fat and total solids. It is also carefully tested for bacteria. If produced under clean conditions and promptly cooled, these should not exceed 100,000 to the cubic centimeter. Where extreme care is used, as in the production of certified milk, the number may be kept below 1,000. Other points considered are the acidity of the milk, the appearance of the package (including metal parts, etc.), and foreign matter. Too often dirt of various kinds is found in the bottom of the bottle, indicating not only dirty conditions during milking, but poor handling, especially as regards straining.

Defects of the product having thus been pointed out, the dairyman will know what is lacking in his product and what he needs to do in order to make it perfect. If the dairyman enters the dairy-farm contest his place is carefully scored and given a definite rating. Ideal conditions are pointed out and he is shown what needs to be done and how it can be done without great expense.

But the question naturally arises: If the dairyman produces a perfect product, can he secure any more money for it? Up to the present time there has been but little incentive to the production of high-class milk, with possibly the exception of certified milk. Clean and dirty milk have sold for the same price and in direct competition with each other. This is not right. With other commodities the grade determines the price. It should be so with milk.

There are indications, however, that the dairyman who produces clean milk will in the future receive a premium for his product, and the careful inspection of the dairy farm and the milk produced is

going to help bring this about. Already an advanced price is being offered by the milk dealers in Cleveland for milk from high-scoring dairies. This certainly is encouraging to the dairyman who is trying to produce a clean product. Every farm should be inspected, and such inspection should be welcomed by every intelligent dairyman. A score such as was given in this contest, stating certain conditions found in the dairies to be satisfactory, will have a tendency to increase the sales and inspire confidence. It will be for the dairyman's interest in the future to produce clean milk, and he should be rewarded for his efforts. Producers should hold together in this matter. Public sentiment is with the movement for a better milk supply, and the prices of feedstuffs and labor being high, the producers have every reason to demand a fair price for a good product. But they should see to it that their product is clean and that it deserves the price demanded. It is not for the producer's interests to allow the consumer to get the idea that this most valuable food product, milk, is produced and handled under dirty conditions.

VALUE TO THE DEALER.

Milk contests are of value to the dealer in assisting him to determine where the good dairies are, hence making it easier for him to find a supply of milk to meet the demands made upon him for a good product. With a supply of good milk to handle, there is less trouble with sour milk and less complaint from consumers.

VALUE TO THE CONSUMER.

The principal value of these contests to the consumer is in pointing out the defects in milk and showing him what good milk really is. Clean milk certainly ought to command a premium over dirty milk. With the average consumer, however, milk is looked upon as a necessity to be bought as cheaply as possible. If he is asked to pay a higher price, he immediately characterizes it as robbery. He gives little thought to the fact that the price of grain has been increasing during the past ten years and that wages for farm labor are not only higher but the labor is difficult to obtain. The consumer should know that it costs more to produce clean milk and that it means extra labor and extra care, and the dairyman can not be expected to produce it without a reasonable profit.

APPLICATION OF THE CLEVELAND PLAN TO OTHER CITIES.

The results obtained in the contest described in the preceding pages indicate that a similar meeting and exhibit would be of value in improving the milk supply of any city. It is simply a means of reaching the producer, the dealer, and the consumer, and educating

them along the line of clean milk. That the plan worked successfully in Cleveland there is no question, and it is believed that there are scores of other cities where similar results might be obtained. Such a contest should have the direct support of the board of health or some organization directly interested in improving the milk supply.

EXTRACTS FROM ADDRESSES.

One of the objects of the contest was to discuss matters of interest to dairymen and give them an opportunity to ask questions. The following are some of the salient points brought out at the meeting:

Dr. H. G. Sherman, chairman municipal sanitation committee, chamber of commerce: The sanitary code prepared by the committee provides that no milk from tuberculous cattle is to be sold within the city limits, but it was not intended that these regulations should be put into operation at once, as some apparently feared. We believe—and we think that you agree with us—that these regulations should be enforced gradually and reasonably, with due regard to the interests of the dairymen and with arrangements for the proper reimbursement of the dairymen.

It is no longer a matter of theory, but it has been clearly proven that a good milk supply is of the greatest importance to the health of city dwellers. A large proportion of disease comes through improper food, and milk is one of the important elements of our food. Especially is this true of infants and young children, those least able to resist disease. With these it may constitute almost the only article of food. Epidemics costing thousands of lives have been traced to tainted or unclean milk. Deaths from typhoid fever, diphtheria, and scarlet fever are often caused by infection carried in the milk. In large cities nearly one-half of the children born die before they are 4 years old, but where all the milk has been carefully inspected this rate has been greatly diminished. You may say that you run the same risk with your children that we do with ours and that you have never discovered any danger; but this is not quite true. In the first place, the milk which you get is fresher than it is when is comes to us, and with you the disease germs which do the harm have not had time to multiply. In the second place, disease spreads much faster in a crowded city than in the country with its scattered population. In the third place, the power of resisting disease in the city is much less than it is in the country. Your children, who play all day in the fresh air and sunshine, who roll on the green grass, and who sleep in the cool night breeze are much more likely to shake off any threatened sickness than the babies in the slum districts, for instance, who must play in the gutter or on the hot pavement in the daytime and sleep in stifling and perhaps crowded rooms at night. The death rate among little children is half as high again in the city as it is in the country, and sickness is in even greater proportion.

Dr. C. W. Eddy, chief of inspection division, public health department: When the Cleveland health department first undertook a definite system of sanitary inspection of the dairies shipping milk to the city the first question that presented itself was a form of report to be used by the inspector. It was first proposed to have a list of questions to be asked by the inspector, the answers to be his report on the dairy inspected. This was tried and found unsatisfactory, as it did not give an adequate description of conditions nor the exact relations of the good features to the indifferent or positively bad. While in this quandary I received a communication from the Dairy Division of the United States Department of Agriculture, in which was described the score card used by the inspectors of that division. It appealed to us at once as a solution of the difficulty, and we proceeded to give it a thorough trial. After a brief use of the card we decided to adopt it in our work.

The card first used has been modified somewhat to make it more applicable to local conditions, but the principle remains the same. The most important feature of the score card is its absolute fairness, it being impossible for the inspector who follows the printed instructions to display any partiality. It further calls the attention of the inspector to many details which he might otherwise overlook, which, from our standpoint at least, are very important. After a dairy is scored and the score card sent in we can tell exactly what conditions exist upon the farm—where it is well equipped and where it is deficient. It should be borne in mind that we inspect the dairies and use the card to bring out the bearing of the production of milk upon the public health. Therefore some features looked upon in this light are of more significance than others and are consequently given a greater weight, as, for instance, cleanliness of milking counts 10 points, while cleanliness of stable yard counts but 3 points. It is difficult for many dairymen to comprehend this, and they are prone to look upon an expensive herd of cattle or barns of more importance than the sanitary features of milk production.

The average score of dairies inspected is too low, being below 50. We hope and expect in time and as we score the dairies more frequently to raise the standard. This is, of course, a matter of education, but with intelligence and patience on both sides we shall certainly succeed, and those of you who profit by the points here discussed will be the first to reap a material benefit in the form of an increased demand for milk produced under sanitary conditions.

Dr. R. G. Perkins, city bacteriologist: Since the establishment of the laboratory the chief part of the work on milk has been of the ordinary routine type. Samples of suspicious milk have been studied, and a long series of counts were made on samples taken from the receiving stations and from wagons in the endeavor to find a suitable standard for the city. As a result of this work the standard was set at 500,000 bacteria per cubic centimeter. Even in the summer months it is the exception rather than the rule that this limit is passed, and it seems that a lower one might be quite practicable. The most interesting work done in the department was an endeavor to find the relative proportion of bacteria in milk obtained from the cans, as served to customers by the so-called "dip method," and that obtained from bottles carried in the same wagons. An ordinance had been passed compelling the delivery in bottles, and these tests were made shortly before it went into effect. Samples were taken from dealers trading in various parts of the city, to cover all the conditions, and were taken every day for a week in each series. The conditions, such as weather, etc., were carefully noted and the following conclusions were reached:

In the average of the 40 samples the "dip" milk was found to contain 37 per cent more bacteria than the bottle milk.

In 77.5 per cent of the samples the "dip" milk contained more bacteria than that in the bottle. Sixteen samples were over 50 per cent higher, and 8 of these were over 300 per cent higher than the corresponding bottled samples.

In 22 samples the bottled milk had most bacteria, only 3 of these being more than 50 per cent over the "dip" samples.

Dry weather, especially with a stiff breeze, usually resulted in an increase of several hundred per cent in the bacterial content of the "dip" milk over the corresponding bottles.

The results of these examinations were considered adequate to justify the ordinance requiring the delivery in bottles exclusively, although in the case of a milkman who is dirty it is quite possible that the use of bottles may increase the amount of bacteria. This, however, is a matter which should be controlled by adequate inspection of the dairies and the bottling plants.

Prof. William Pate, Jr., city chemist: Our work consists wholly of the determination of quality as required by law and examination for the presence of chemical preservatives, colors, cream thickeners, or other adulterants. We collect and test

40 samples of milk a day, taken from the milkmen upon the streets and from the stations as it is delivered to the milkmen. The Ohio law and our municipal requirements are that the milk must contain 3 per cent of fats and 12 per cent of solids for the entire year. Formerly the requirement was 2.8 per cent fats and 11.5 per cent solids during the grass months of May and June, but it seems that 3 and 12 per cent are low enough even for these months, and we conclude that any herd which produces milk below these limits is not a well-balanced herd, at least before our law. It is very true that some herds are producing milk below 3 and 12 per cent, but the producer having such a herd should balance it with animals giving lesser quantity but richer quality so as to bring his average for the entire herd up to the legal requirement.

For the year just passed we had for average results of 6,045 samples of milk taken: Lactometer, 312; fats, 3.71 per cent; solids, 12.51 per cent. And for the year 1905, 5,890 samples: Lactometer, 312; fats, 3.81 per cent; solids, 12.65 per cent.

As the average result of the year will show, we have very good milk in Cleveland from the standpoint of quality as required by our law, although it is only fair to say to the producers that the milk as it comes into the city is better than it is when delivered to the consumer. I cite a few instances:

Table showing composition of milk as received by milkmen and as delivered to consumers.

As received by milkman.		As delivered to consumer.	
Fats.	Solids.	Fats.	Solids.
Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
3.9	12.69	3.3	12.02
4.1	12.77	3.4	12.17
4.2	13.05	3.2	11.59
3.8	12.62	2.7	10.55
3.8	12.77	3.1	11.18
4.0	13.21	3.2	12.20

The examination for the presence of preservatives consists in carrying along a test for formaldehyde with all samples taken. We are particularly free from this preservative in Cleveland, but six samples having been found treated with formaldehyde in 1905 and four in 1906. The offenders were immediately prosecuted, but in addition to prosecution the board of health uses an effective weapon in the revocation of licenses. The present policy is to revoke the license of any man who is found to have on sale an adulterated milk. Tests for the presence of sodium carbonate, borax, colors, etc., are carried on from time to time as is found necessary. In the past two years we found one sample containing carbonate and one to which annatto had been added as an enriching color.

D. C. Hale, milk producer: In the past milk delivered to the Cleveland trade has been looked upon simply as milk, with no thought of the conditions under which it was produced. Whether it came from sanitary or insanitary stables it was all sold as one grade and for the same price. But now, since the question has been agitated and brought to the attention of the consumer, we producers look for more definite rules and regulations governing the city milk traffic whereby the dairyman may be rightfully compensated for his painstaking labor.

There is no reason why milk produced in a well-kept dairy of healthy cows where sanitary methods are practiced should not bring more money than that produced by the careless dairyman. It has long been a puzzling problem to many of us why it was that other farm products could be placed in the city market strictly on their merits, while milk, which enters into more foodstuffs than any other product, has to be sold simply as milk and usually for one common price regardless of what has entered into the production of that product. We who profess to have produced sanitary milk in the past have an opportunity at this time to take an advance step in

the way of adopting more rigid sanitary rules that may be recommended for the good of the consumer and that may prove practical and, we hope, beneficial to the producer in returning him a more remunerative price for his extra care and attention.

I believe that it is injurious to the general health of a cow to be turned out of a warm stable and allowed to remain out and get chilled, as is the practice with many dairymen. If cows must be turned out of the stable in winter to get water, they should be put in the stable just as soon as they return from water. Keeping the cows comfortable will save hay and grain, increase the milk production, and keep the herd in better health. The kind of feedstuff to be used is a matter of choice, economy, and convenience. If there is one domestic animal more than another that is deserving of sunshine in her home during the winter months it is the cow, not only for her enjoyment, but for her health.

Milk should be handled in such a way, after it leaves the milk room, as to lower the temperature rather than raise it. It should not be exposed to the hot sun. We should urge the importance of transportation companies doing their part toward taking care of the temperature of the milk after it has been delivered to them and until they have delivered it to the city milk dealer.

CLEVELAND'S EXPERIENCE WITH THE TUBERCULIN TEST.

Cleveland was one of the first cities to incorporate in its ordinances a requirement that no milk should be sold in the city except from dairies holding certificates that their cows are free from tuberculosis as shown by the tuberculin test. The experience of this city is therefore of interest and value in connection with the subject of a wholesome milk supply for cities. Following are the sections of the Cleveland ordinance relating to the tuberculin test:

PART ONE, TITLE V.

SEC. 4. On and after the ——— day of ———, 1906, no milk will be allowed to be sold or offered for sale or brought into the city from any cow or cows unless the owner of said cow or cows holds a certificate of this board's veterinarian, or other veterinarian acceptable to this board, that said cow or cows are free from tuberculosis as shown by the tuberculin test.

SEC. 5. Any person selling or offering for sale any milk from uninspected cows as above shall be subject to having his license revoked.

The city did not attempt at the outset to require all dairymen to conform to this section, and it is not the intention to do so until the State laws on the subject are more efficient and provide prompt compensation for cattle destroyed. At present the tuberculin test is required only of dairies where tuberculosis is known to exist as determined by physical examination or by tracing cattle killed at abattoirs. If the owner does not consent to the test and to the slaughter of the reacting cattle, his milk is excluded from sale in the city, and in addition the State board of live stock commissioners is notified, which commissioners have the authority to enforce the test or to quarantine the suspected herd. If the owner consents, the test is made free of charge. After the test the reacting cattle are appraised by two disinterested persons, one selected by the board of health, the

other by the owner. The average between the two values is taken as the true value, and the appraisal and report of the test is submitted to the State board of live stock commissioners. If this board approves the finding, an order is issued authorizing the health department to destroy the reacting cattle, which is done and promptly reported back to the State authorities. The approved appraisal is then submitted to the governor, approved by him, and submitted to the proper committee of the legislature, which finally instructs the State auditor to draw a warrant for the claim. The law allows from one-half to three-fifths of the appraised value, but so far all claims have been paid in full.

The attitude of the dairymen toward the test was somewhat hostile at first, which was natural, as it was a great surprise to them to find that tuberculosis existed to such an extent among their herds. Several instances were met, however, even at the first, of exceedingly public-spirited dairymen who did all in their power to assist the board of health, even where the losses were very severe. The hostile feeling manifest at first has since given way to a fair-minded conception of the situation, and the only objection to the general application of the test is the long delay in the payment of the claims. This is a very great hardship on a dairyman who is in debt and dependent upon his cattle for the support of his family, especially as in Ohio the legislature meets only every alternate year.

The following are the statistics of the work of the board of health for the eighteen months beginning with January, 1906:

Number of herds tested	20
Number of cattle tested	280
Number of reactions	89
Percentage of reactions	32

Tested by other veterinarians under direct supervision of the board of health:

Number of herds tested	13
Number of cattle tested	201
Number of reactions	29
Percentage of reactions	15

It is understood that within the same period about three times as many cows have been tested by private veterinarians, the reacting cattle being secretly sold and shipped to other States.

The greatest good accomplished has been in the dissemination of knowledge concerning bovine tuberculosis among not only the dairymen, but the people generally. The health office receives almost daily inquiries as to where milk from tuberculin-tested cows can be had for domestic purposes, and almost as many inquiries as to where tuberculin-tested cows can be purchased. Nearly one-half of the herds tested have been tested as the result of requests of owners

who desired to know for themselves what condition their herds were in. This has been specially true in the last six months. It is expected that more cattle will be tested in the next year than in the preceding eighteen months, and if State laws can be passed that will be satisfactory and efficient and provide a fair compensation there will probably be more herds to test than the present force can handle.

The efforts of the Cleveland board of health to eradicate tuberculosis from dairy herds and to secure a safe milk supply for the city deserve commendation, and other cities may well profit by this experience and adopt similar measures to safeguard the health of the public.

IMPORTANCE OF THE TUBERCULIN TEST.

The public has become aroused and general interest is being manifested especially in measures for reducing the mortality from tuberculosis in human beings. This is shown by the formation of societies throughout the country for furthering these measures and by the general campaign of education which is now under way. It has been shown beyond question that human tuberculosis and animal tuberculosis are communicable between persons and animals, and that a considerable proportion of the cases of human tuberculosis are caused by infection from animal sources. The eradication of tuberculosis from dairy cows is therefore very desirable as a protection to human health.

The tuberculin test is recognized by sanitarians as an agency of the greatest value for detecting tuberculosis in dairy herds and for controlling and eradicating the disease. Without its assistance but a small percentage of the cases could be detected in the live animals. It is remarkably accurate, the records of thousands of cases in which the animals have afterwards been slaughtered showing a correct diagnosis in 97 per cent.

Unfortunately, in the early attempts to control tuberculosis in some States, measures were adopted which were so radical that they aroused the antagonism of the dairymen and cattle owners generally, and little was accomplished in the way of either benefiting the cattle owners or removing the dangers of the disease to the public. It is time that those interested in the dairy and live-stock industries of the country should give their support to all measures tending to check this widespread disease and to prevent the serious losses which it causes. It is to their interest to do so purely as a business proposition, regardless of any benefit to the public health.

A practice which is largely instrumental in the spread of tuberculosis is the sale of animals known to be diseased without transmitting this knowledge to the buyer. This is done not only in private sales, but at public auctions as well. This practice should be stopped Where the tuberculin test is used under the direction of

a board of health, the animals as a rule are properly marked (usually by placing metal disks in the ears), showing whether they are tuberculous or healthy. This plan is to be commended, as it renders difficult the deception of a purchaser.

While some States have laws prohibiting the importation of cattle without the certificate of a veterinarian showing that they have passed the test, other States have no such laws, and the transfer of animals from one State to another goes on without molestation. This shows the necessity of the Federal Government taking some action in the near future to prevent the interstate shipment of diseased animals. The work of the Government might also be extended still further in a cooperative way, so that, when the disease is discovered, the information will be communicated both to the owners of the animals and to the proper State authorities.

The Bureau of Animal Industry furnishes tuberculin free of charge to public officials for making tests under certain conditions.

METHODS FOR ERADICATING TUBERCULOSIS.

This subject has been discussed at some length by Dr. D. E. Salmon in Bulletin 38 of the Bureau of Animal Industry. Because of its important bearing on the improvement of the milk supply, the following extract from that publication is appended:

ERADICATION OF TUBERCULOSIS FROM THE FARM.

If there is any reason to suspect the existence of tuberculosis in a herd, an effort should be made at once to determine definitely whether it is present and which animals are affected by it.

The general condition of the animal should furnish some indication. If any of the animals are not doing well, are losing flesh, and fail to yield the amount of milk which is to be reasonably expected, a careful examination should be made of them to determine whether their temperature is normal, whether there are signs of enlargement of the external lymphatic glands, and whether abnormal sounds can be detected in the lungs. The examination of the carcasses of any animals which may have died or are slaughtered is a valuable indication as to the existence of the disease in the herd.

The most reliable means of determining this question is, however, the tuberculin test. While this may occasionally fail to reveal tuberculosis in an individual animal, it may be relied upon with certainty to reveal the existence of the disease in a herd. If this test indicates that some of the animals are tuberculous, measures should be at once adopted to eradicate the disease from the herd, or at least to prevent its further spread. In case there are only one or two animals affected, and these are not especially valuable, the best plan is to slaughter them at once and thoroughly disinfect the stable in which they have been kept. If a large proportion of a herd is affected, and the animals are not especially valuable, the best and cheapest plan would be to separate the reacting animals from the healthy ones, and to have the former slaughtered under inspection as soon as they can be put in proper condition. It is probable that the flesh of most of these animals would be found fit for food, and the loss, therefore, would not be very great. In case the herd has been long affected and many of the animals are in an advanced stage of the disease, they are unfit for milk production, and the sooner they are slaughtered the less will be the loss.

If the herd contains animals which are valuable for breeding purposes, the Bang system of management or some modification of it may be profitably adopted.

STATE AID FOR THE ERADICATION OF TUBERCULOSIS.

In the eradication of a disease so widely disseminated, and one which causes such serious losses to the animal industry of the country, there should be assistance offered by the State in order to relieve the burdens which fall upon the owners of live stock. A considerable number of States have shown a disposition to come to the assistance of farmers whose stock is affected, but the assistance has sometimes been coupled with conditions which made it unwelcome. In some States compulsory testing and the slaughter of reacting animals have been required, but this has not been a popular measure. It is essential that a plan should be devised which will meet with the approval of the stock owners and which will aid them without being too burdensome in its conditions. There are certain measures which have been adopted by individual States which have accomplished satisfactory results but which would be far more successful if adjoining States would adopt the same or similar regulations. Among the reasonable measures which a State may adopt for the repression of tuberculosis the following may be mentioned:

1. Cattle which are brought into a State for breeding or dairy purposes may be tested with tuberculin, and those which react may be refused admission to the State. In connection with this measure it should be provided that cattle which have been tested by the authorities of another State or of the Federal Government and found free from disease should be allowed admission without being retested. The testing of animals coming into a State is essential in any effort to control this disease and is one of the first measures which should be enforced in any effort to eradicate it.

2. There should be an inspection of all slaughtered animals coming from breeding or dairy herds within the State in order to discover in what herds the disease exists. Animals from the greater part of the milk-producing herds are being continually sold for slaughter as their usefulness in the dairy is over, and an examination of the carcasses of these cows would serve to locate the existence of the disease in many herds where its presence is unsuspected. Unfortunately, few of the animals killed in the small slaughterhouses are inspected, and in those cases where there is an inspection and tuberculosis is discovered it is seldom that the herds from which they came are traced and the owners informed of the discovery of this disease. In any effort to suppress tuberculosis it is almost essential that information of this kind should be obtained and an attempt made to persuade the owner to adopt proper measures for getting rid of the contagion.

3. Measures should be adopted for testing herds with tuberculin without expense to the owners. In the beginning of the work, at least, this should not be compulsory, but it should be made to the interest of the owner of a tuberculous herd to have it tested under the auspices of the State. Apparently, it would also be wise and a great aid to stockmen for the State to test herds with tuberculin and certify to the healthfulness of animals from all those herds where no reactions occur. At present it is a difficult matter in most States for the breeder or dairyman to purchase cattle for his herd with any assurance that they are healthy. He may have them tested, but there is always a possibility that they have been treated with tuberculin a short time before and that for this reason they have not reacted. The loss which has fallen upon the breeders of the country through the introduction of tuberculosis in their herds has been tremendous, and it appears that it would be only a proper aid and encouragement to agricultural interests to assist breeders in obtaining animals free from disease. Not only would this encourage farmers to enter into breeding operations and increase the value of the industry within the State, but the certification of breeding animals would help to build up a market in other States for breeding animals.

4. In order to encourage the owners of cattle to eradicate tuberculosis, States should allow a reasonable compensation for the animals which it is necessary to slaughter on account of being affected with this disease. It is certainly a matter of great importance to any State to have its herds free from tuberculosis and its animals and animal products above suspicion. With the recent demonstration of the communicability of animal tuberculosis to man, a demonstration which has been made by so many investigators and on such competent authority that the fact can no longer be questioned, there is a disposition on the part of sanitary authorities to scrutinize more carefully those animal products which are liable to be infected. It is, therefore, becoming every day more important for every State to repress tuberculosis within its borders and in that manner to maintain the reputation of its animal products. Where it is not deemed advisable to provide for slaughtering of all reacting animals with sufficient compensation from the State to make this measure satisfactory to the stockmen, the State may provide for the supervision of herds handled according to the Bang method or some modification of it. For the protection of its own citizens who consume dairy products, if not for the protection of its customers in other States, every State should make some arrangement which would lead to the removal of cows with tuberculous udders and those suffering from generalized tuberculosis from herds which supply milk, cream, and butter for human food. This much is essential for the public health, but it would be wise to go further and provide for the slaughter of all cows which show evidence on physical examination of being affected with tuberculosis.

5. In cases where cattle owners are to have their tuberculous animals slaughtered in an effort to free their herds from disease the State should further assist them by disinfecting or at least supervising the disinfection of the contaminated stables. It is a somewhat difficult matter for persons not acquainted with the practical operations of disinfection to carry out this measure successfully, even after they have been given explicit instructions. It is impossible to impress sufficiently the importance of thoroughness upon persons who are lacking in experience in this line of work. As a consequence the majority of the premises disinfected by stockmen without the assistance of experts are imperfectly disinfected, and the disease breaks out again among the animals which are subsequently introduced. This is discouraging to the owner and serves to fix the impression that it is impossible to eradicate tuberculosis. This impression is already widespread, but it is essentially wrong, though it can only be removed by object lessons in the eradication of the disease under State supervision. There is no reason why tuberculosis should not be eradicated as pleuro-pneumonia was eradicated. The contagion is more widespread and the expense would be greater, but there are no inherent difficulties to prevent the success of such an undertaking.

6. When a herd has been freed from tuberculosis by the slaughter of all reacting animals, and the premises have been properly disinfected, the State should give further aid to the stock owner by testing without expense the animals which he desires to purchase for renewing his herd. This measure is essential to the success of any plan for lessening the prevalence of this disease or eradicating it. The expense of testing such animals is almost too great to be borne by the individual, and, moreover, private tests are often unsatisfactory and unreliable.

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